

PATENT COOPERATION TREATY

RECEIVED

JAN 14 2002

GOODYEAR PATENT
& TRADEMARK DEPT.

PCT

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

KING, David L.
The Goodyear Tire & Rubber Company
D/823
1144 East Market Street
Akron, Ohio 44316-0001
ETATS-UNIS D'AMERIQUE

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Rule 71.1)

Date of mailing
(day/month/year) 03.01.2002

Applicant's or agent's file reference
DN1999223PCT

IMPORTANT NOTIFICATION

International application No.
PCT/US99/23312

International filing date (day/month/year)
06/10/1999

Priority date (day/month/year)
06/10/1999

Applicant
THE GOODYEAR & TIRE RUBBER COMPANY et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

*See
WPK
1/22/02*

Name and mailing address of the IPEA/

 European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized officer

Reiff, U

Tel. +49 89 2399-8070



PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

| | | |
|---|---|--|
| Applicant's or agent's file reference DN1999223PCT | <div style="display: flex; justify-content: space-between;"> FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) </div> | |
| International application No. PCT/US99/23312 | International filing date (<i>day/month/year</i>) 06/10/1999 | Priority date (<i>day/month/year</i>) 06/10/1999 |
| International Patent Classification (IPC) or national classification and IPC B60C15/024 | | |
| Applicant THE GOODYEAR & TIRE RUBBER COMPANY et al. | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☒ Certain defects in the international application
 - VIII ☒ Certain observations on the international application

| | |
|---|---|
| Date of submission of the demand 09/04/2001 | Date of completion of this report 03.01.2002 |
| Name and mailing address of the international preliminary examining authority: <div style="display: flex; align-items: center;"> <div> European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 </div> </div> | Authorized officer Peschel, W Telephone No. +49 89 2399 2702 <div style="text-align: right;"> </div> |

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/US99/23312

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):
Description, pages:

1,2,4-7 as originally filed

3,3a as received on 22/10/2001 with letter of 18/10/2001

Claims, No.:

1-3 as received on 22/10/2001 with letter of 18/10/2001

Drawings, sheets:

1/6-6/6 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/US99/23312

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | |
|-------------------------------|-----------------|
| Novelty (N) | Yes: Claims 1-3 |
| | No: Claims |
| Inventive step (IS) | Yes: Claims 1-3 |
| | No: Claims |
| Industrial applicability (IA) | Yes: Claims 1-3 |
| | No: Claims |

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

V. Reason and statement

2. Citations and explanations

Reference is made to the following documents:

D1: US-A-1 396 515 (W. S. MCCLEVEY) 8 November 1921

D2: PATENT ABSTRACTS OF JAPAN vol. 017, no. 524 (M-1483), 21
September 1993 (1993-09-21) & JP 05 139106 A (SUMITOMO RUBBER IND
LTD), 8 June 1993 (1993-06-08)

D3: US-A-4 015 652 (HARRIS JAMES T) 5 April 1977, cited in the application

2.1 Novelty of independent claim 1

Document **D1**, which is considered to represent the most relevant state of the art to the subject-matter of claim 1 and also facing the problem of tire/rim slip under torque, discloses (cf. figs. 3 - 6; page 1, lines 12 - 18; page 2, lines 3 - 15)

- "an (improved) pneumatic tire **8** particularly suited for mounting on a rim **9** having knurls **10**, **12** designed to engage a bead surface of the tire **8**, the bead surface (of the tire) including a bead base, a radially inner flange contacting surface and a radially outer flange contacting surface, the tire **8** having knurls, the knurls on the tire **8** having a location and a pitch complementary to the knurls **10**, **12** of the rim **9** such that the knurls on the tire **8**, when mounted on the rim **9**, interlock with the knurls **10**, **12** on the rim **9**

whereby

the knurls being located in the bead base and the radially inner flange contacting surface."

The subject-matter of claim 1 differs from that known tire in that:

- (i) the rim specified in D1 is no design rim specified by an international rim standardization authority like the ETRTO or the Tire and Rim Association, Inc.,
- (ii) the knurls of the tire being of complementary cross-section to the knurls of the rim,
- (iii) additional knurls being provided in the radially outer flange contacting surface, and

- (iv) the knurls (of the tire) being capable of interlocking with the design rim in all three locations.

Thus, the subject-matter of **independent claim 1** is **new** in the sense of Art. 33(2) PCT.

Due to the distinguishing features (i) to (iv), the **problem to be solved** by the present invention may be regarded as to prevent slippage between the tire and the rim even if the tire is heavily loaded.

The **solution** to this problem **proposed in claim 1 of the present application is considered as involving an inventive step** (Article 33(3) PCT) for the following reasons: In particular the distinguishing features (iii) and (iv) are neither known nor derivable in an obvious manner from prior art documents D1 and D2.

Document D1 merely provides axially and radially oriented knurls in the bead base area and in the radially inner flange contacting portion, respectively.

Document D2 even fails to disclose any knurls in the radial flange contacting portion. Therefore, the provision of knurls also in the radially upper flange contacting portion appears to be inventive, especially as the underlying problem to prevent slip between the tire and the rim even under heavy load resulting in partial take off of the radially inner flange contacting portion was not even mentioned before.

It is however noted, that in case the deficiencies under Article 6 PCT (see chapter VIII.) are not overcome by suitable amendment, document D3 would appear to render the invention obvious since it discloses features (ii) to (iv). The knurls of document D3, however, are oriented in the circumferential direction.

- 2.2 Claims 2 and 3 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

VII. Certain defects in the international application

1. Although claim 1 is drafted in the two-part form the features that
 - (axially and radially, respectively, oriented) **knurls being provided in the bead base portion and in the radially inner flange contacting portion**are incorrectly placed in the characterising portion, as they are disclosed in

document D1 in combination with the features placed in the preamble (Rule 6.3(b) PCT).

2. Provision of knurls only in the bead base portion does not longer fall within the scope of protection of independent claim 1. Accordingly, lines 26 to 32 of page 5 of the description render the application unclear and should be deleted.

VIII. Certain observations on the international application

1. It is clear from the application(see pages 3 to 7 of the description) that the knurls have to be oriented perpendicular to the circumferential direction (i.e. oriented in the axial and radial direction, respectively).

See for instance page 3, lines 9 and 10: - "Additionally, the circumferential orientation of the protrusions will not provide any shear force resistance to tire slippage; page 5, line 17: - "Thus, a shear force F_s must be overcome before slippage can occur".

Since independent claim 1 does not contain any feature indicating the orientation of the knurls, claim 1 does not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

the knurl.

United States Patent No. 4,015,652 shows a tire and rim assembly where both the vertical area of the tire and the rim flange have a plurality of protrusions. Each of the
5 protrusions disclosed in this patent forms a complete line extending circumferentially around the tire and the rim. The protrusions increase the surface area between the two surfaces where an adhesive is applied to help retain a deflated tire on the rim. Although the increased area of contact caused by the disclosed protrusions may slightly increase the amount of torque the tire can withstand before slippage occurs, the disclosure shows no teaching concerning tire
10 slippage. Additionally, the circumferential orientation of the protrusions will not provide any shear force resistance to tire slippage.

The most relevant prior art patent is U.S. 1,396,515 dated November 8, 1921, teaches a pneumatic tire suited for mounting on a rim having knurls designed to engage a bead surface of the tire where the tire has knurls, the knurls on the tire having a location and a pitch
15 complimentary to the knurls on the rim such that the knurls interlock with the knurls on the rim 9 in order to prevent tire slip.

Summary of the Invention

This invention relates to a pneumatic tire 10. The pneumatic tire 10 has a bead 30 for mounting the tire 10 on a rim 12. The tire 10 is particularly suited for mounting on a design rim
20 12 having knurls 20. The rim knurls 20 are designed to engage the bead surface 28 of the tire 10. The bead surface 28 includes a bead base 36, a radially inner flange contacting surface 38, and a radially outer flange contacting surface 10.

The tire 10 of the invention has knurls 42. The tire knurls 42 have a location and a pitch that is complementary to the knurls 20 specified by applicable rim standards for the tire's
25 size such that the tire knurls 42 interlock with the rim knurls 20 when the tire 10 is mounted on the design rim 12 at all three locations 36, 38 and 40. By interlocking the rim knurls 20 and the tire knurls 42, the tire 10 will be less susceptible to slippage. The knurls 42 are preferably of a triangular cross-section as well as the rim knurls 20.

Definitions

30 For ease of understanding this disclosure, the following terms are disclosed.

"Bead" means that part of the tire comprising an annular tensile member wrapped by ply cords and shaped, with or without other reinforcement elements such as flippers, chippers, apexes, toe guards and chafers, to fit the rim. The radially inner beads are associated with holding the tire to the rim.

35 "Bead surface" means the outer portion of the tire near the bead which is in proximity or

3a

contacts the rim and consists of the bead toe, the bead base, the bead heel, and the flange contacting surface.

5 “Bead toe” means that portion of the bead which joins the bead base at the inside surface of the tire.

 “Bead heel” means that portion of the bead which joins the bead base at the outer surface of the tire and is in proximity or in contact with the rim when the tire is mounted on the rim.

 “Circumferential” means lines or directions extending along a perimeter of the surface of

CLAIMS

What it claimed is:

1. An improved pneumatic tire (10) particularly suited for mounting on a design rim (12)
5 having knurls (20) designed to engage a bead surface (28) of the tire (10), the bead surface (28) including a bead base (36) and a radially inner flange contacting surface (38) and a radially outer flange contacting surface (40), the tire (10) having:
having knurls (42), the knurls (42) on the tire (10) having a location and a pitch complimentary to the knurls (20) specified by applicable rim standards for the tire's size such that
10 the knurls (42) on the tire (10), when mounted on the design rim (12), interlock with the knurls (20) on the design rim (12), the tire (10) characterized by:
the knurls (42) being of a complimentary cross-section to the knurls (20) and located in all three locations of the bead surface (28), the bead base (36), the radially inner flange contacting surface (38) and the radially outer flange contacting surface (40), the knurls (42) being capable of
15 interlocking with the design rim (12) in all three locations (36,38,40).
2. The improved pneumatic tire 10 of claim 1 wherein the knurls (42) having a triangular cross-section.
3. The improved pneumatic tire of claim 1 wherein the knurls (42) on the bead base (36) have a length L_k of at least 40% L_b .

PATENT COÖPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT
OR THE DECLARATION

(PCT Rule 44.1)

To:

The Goodyear Tire & Rubber Company
Attn. BROWN, Robert W.
1144 East Market Street
Akron, Ohio 44316-0001
UNITED STATES OF AMERICA

Date of mailing
(day/month/year)

30/05/2000

Applicant's or agent's file reference

DN1999223PCT

FOR FURTHER ACTION

See paragraphs 1 and 4 below

International application No.

PCT/US 99/ 23312

International filing date
(day/month/year)

06/10/1999

Applicant

THE GOODYEAR & TIRE RUBBER COMPANY et al.

1. ☒ The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

Within 19 months from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within 20 months from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Seen
Wijk
6/19/00

Name and mailing address of the International Searching Authority



European Patent Office, P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Amélie Möller

RECEIVED

JUN 5 2000

GOODYEAR PATENT
& TRADEMARK DEPT.

JUN 06 2000

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

NOTES TO FORM PCT/ISA/220 (continued)

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."
2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international application is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

INTERNATIONAL SEARCH REPORT

Int. Application No.

PCT/US 99/23312

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B60C15/024 B60B21/10 B60C15/02 B60B21/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B60C B60B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| X | US 1 396 515 A (W. S. MCCLEVEY) 8 November 1921 (1921-11-08) the whole document --- | 1 |
| X | US 4 015 652 A (HARRIS JAMES T) 5 April 1977 (1977-04-05) cited in the application column 2, line 27 - line 36; figures 3-5 --- | 1 |
| A | US 4 561 481 A (KAWAUCHI KAZUNORI ET AL) 31 December 1985 (1985-12-31) cited in the application column 2, line 5 - line 15; claims; figures --- -/-- | 1 |



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

23 May 2000

Date of mailing of the international search report

30/05/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Baradat, J-L

INTERNATIONAL SEARCH REPORT

Int. Application No

PCT/US 99/23312

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| A | PATENT ABSTRACTS OF JAPAN vol. 017, no. 524 (M-1483), 21 September 1993 (1993-09-21) & JP 05 139106 A (SUMITOMO RUBBER IND LTD), 8 June 1993 (1993-06-08) abstract --- | 1 |
| A | BE 675 106 A (KLEBER-COLOMBES) 14 July 1966 (1966-07-14) claims; figures --- | 1 |
| A | PATENT ABSTRACTS OF JAPAN vol. 018, no. 526 (M-1683), 5 October 1994 (1994-10-05) & JP 06 183223 A (SUMITOMO RUBBER IND LTD), 5 July 1994 (1994-07-05) abstract ----- | 1 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 99/23312

| Patent document cited in search report | | Publication date | Patent family member(s) | | Publication date |
|---|---|---------------------|----------------------------|---|---------------------|
| US 1396515 | A | 08-11-1921 | NONE | | |
| US 4015652 | A | 05-04-1977 | NONE | | |
| US 4561481 | A | 31-12-1985 | JP 1044521 | B | 28-09-1989 |
| | | | JP 1575531 | C | 24-08-1990 |
| | | | JP 57205202 | A | 16-12-1982 |
| | | | DE 3208843 | A | 05-01-1983 |
| JP 05139106 | A | 08-06-1993 | NONE | | |
| BE 675106 | A | 14-07-1966 | CH 433033 | A | |
| | | | FR 1434207 | A | 17-06-1966 |
| | | | LU 50260 | A | 14-07-1966 |
| | | | NL 6600375 | A | 15-07-1966 |
| JP 06183223 | A | 05-07-1994 | NONE | | |

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

12


| | | |
|--|---|--|
| Applicant's or agent's file reference DN1999223PCT | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) | |
| International application No. PCT/US99/23312 | International filing date (day/month/year) 06/10/1999 | Priority date (day/month/year) 06/10/1999 |
| International Patent Classification (IPC) or national classification and IPC B60C15/024 | | |
| Applicant THE GOODYEAR & TIRE RUBBER COMPANY et al. | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.
 - ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

| | |
|---|---|
| Date of submission of the demand 09/04/2001 | Date of completion of this report 03.01.2002 |
| Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 | Authorized officer Peschel, W Telephone No. +49 89 2399 2702  |

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/US99/23312

I. Basis of the report

1. With regard to the **contents** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1,2,4-7 as originally filed

3,3a as received on 22/10/2001 with letter of 18/10/2001

Claims, No.:

1-3 as received on 22/10/2001 with letter of 18/10/2001

Drawings, sheets:

1/6-6/6 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/US99/23312

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | | |
|-------------------------------|------|--------|-----|
| Novelty (N) | Yes: | Claims | 1-3 |
| | No: | Claims | |
| Inventive step (IS) | Yes: | Claims | 1-3 |
| | No: | Claims | |
| Industrial applicability (IA) | Yes: | Claims | 1-3 |
| | No: | Claims | |

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

V. Reason and statement

2. Citations and explanations

Reference is made to the following documents:

D1: US-A-1 396 515 (W. S. MCCLEVEY) 8 November 1921

D2: PATENT ABSTRACTS OF JAPAN vol. 017, no. 524 (M-1483), 21

September 1993 (1993-09-21) & JP 05 139106 A (SUMITOMO RUBBER IND LTD), 8 June 1993 (1993-06-08)

D3: US-A-4 015 652 (HARRIS JAMES T) 5 April 1977, cited in the application

2.1 Novelty of independent claim 1

Document **D1**, which is considered to represent the most relevant state of the art to the subject-matter of claim 1 and also facing the problem of tire/rim slip under torque, discloses (cf. figs. 3 - 6; page 1, lines 12 - 18; page 2, lines 3 - 15)

- "an (improved) pneumatic tire **8** particularly suited for mounting on a rim **9** having knurls **10, 12** designed to engage a bead surface of the tire **8**, the bead surface (of the tire) including a bead base, a radially inner flange contacting surface and a radially outer flange contacting surface, the tire **8** having knurls, the knurls on the tire **8** having a location and a pitch complementary to the knurls **10, 12** of the rim **9** such that the knurls on the tire **8**, when mounted on the rim **9**, interlock with the knurls **10, 12** on the rim **9**

whereby

the knurls being located in the bead base and the radially inner flange contacting surface."

The subject-matter of claim 1 differs from that known tire in that:

- (i) the rim specified in D1 is no design rim specified by an international rim standardization authority like the ETRTO or the Tire and Rim Association, Inc.,
- (ii) the knurls of the tire being of complementary cross-section to the knurls of the rim,
- (iii) additional knurls being provided in the radially outer flange contacting surface, and

- (iv) the knurls (of the tire) being capable of interlocking with the design rim in all three locations.

Thus, the subject-matter of **independent claim 1** is **new** in the sense of Art. 33(2) PCT.

Due to the distinguishing features (i) to (iv), the **problem to be solved** by the present invention may be regarded as to prevent slippage between the tire and the rim even if the tire is heavily loaded.

The **solution** to this problem **proposed in claim 1 of the present application is considered as involving an inventive step** (Article 33(3) PCT) for the following reasons: In particular the distinguishing features (iii) and (iv) are neither known nor derivable in an obvious manner from prior art documents D1 and D2.

Document D1 merely provides axially and radially oriented knurls in the bead base area and in the radially inner flange contacting portion, respectively.

Document D2 even fails to disclose any knurls in the radial flange contacting portion. Therefore, the provision of knurls also in the radially upper flange contacting portion appears to be inventive, especially as the underlying problem to prevent slip between the tire and the rim even under heavy load resulting in partial take off of the radially inner flange contacting portion was not even mentioned before.

It is however noted, that in case the deficiencies under Article 6 PCT (see chapter VIII.) are not overcome by suitable amendment, document D3 would appear to render the invention obvious since it discloses features (ii) to (iv). The knurls of document D3, however, are oriented in the circumferential direction.

- 2.2 Claims 2 and 3 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

VII. Certain defects in the international application

1. Although claim 1 is drafted in the two-part form the features that
 - (axially and radially, respectively, oriented) **knurls being provided in the bead base portion and in the radially inner flange contacting portion**are incorrectly placed in the characterising portion, as they are disclosed in

document D1 in combination with the features placed in the preamble (Rule 6.3(b) PCT).

2. Provision of knurls only in the bead base portion does not longer fall within the scope of protection of independent claim 1. Accordingly, lines 26 to 32 of page 5 of the description render the application unclear and should be deleted.

VIII. Certain observations on the international application

1. It is clear from the application(see pages 3 to 7 of the description) that the knurls have to be oriented perpendicular to the circumferential direction (i.e. oriented in the axial and radial direction, respectively).

See for instance page 3, lines 9 and 10: - "Additionally, the circumferential orientation of the protrusions will not provide any shear force resistance to tire slippage; page 5, line 17: - "Thus, a shear force F_s must be overcome before slippage can occur".

Since independent claim 1 does not contain any feature indicating the orientation of the knurls, claim 1 does not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

| | | |
|---|---|---|
| Applicant's or agent's file reference DN1999223PCT | FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below. | |
| International application No. PCT/US 99/ 23312 | International filing date (day/month/year) 06/10/1999 | (Earliest) Priority Date (day/month/year) |
| Applicant THE GOODYEAR & TIRE RUBBER COMPANY et al. | | |

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the language, the International search was carried out on the basis of the International application in the language in which it was filed, unless otherwise indicated under this item.

☐ the International search was carried out on the basis of a translation of the International application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any nucleotide and/or amino acid sequence disclosed in the International application, the International search was carried out on the basis of the sequence listing:

☐ contained in the International application in written form.

☐ filed together with the International application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the International application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (see Box II).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this International search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

6

☐ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☒ because this figure better characterizes the invention.

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

PCT 99/23312

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B60C15/024 B60B21/10 B60C15/02 B60B21/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B60C B60B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| X | US 1 396 515 A (W. S. MCCLEVEY) 8 November 1921 (1921-11-08) the whole document --- | 1 |
| X | US 4 015 652 A (HARRIS JAMES T) 5 April 1977 (1977-04-05) cited in the application column 2, line 27 - line 36; figures 3-5 --- | 1 |
| A | US 4 561 481 A (KAWAUCHI KAZUNORI ET AL) 31 December 1985 (1985-12-31) cited in the application column 2, line 5 - line 15; claims; figures --- -/-- | 1 |



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

23 May 2000

Date of mailing of the international search report

30/05/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Baradat, J-L

INTERNATIONAL SEARCH REPORT

International Application No

PCT 99/23312

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|----------|--|-----------------------|
| A | PATENT ABSTRACTS OF JAPAN vol. 017, no. 524 (M-1483), 21 September 1993 (1993-09-21) & JP 05 139106 A (SUMITOMO RUBBER IND LTD), 8 June 1993 (1993-06-08) abstract --- | 1 |
| A | BE 675 106 A (KLEBER-COLOMBES) 14 July 1966 (1966-07-14) claims; figures --- | 1 |
| A | PATENT ABSTRACTS OF JAPAN vol. 018, no. 526 (M-1683), 5 October 1994 (1994-10-05) & JP 06 183223 A (SUMITOMO RUBBER IND LTD), 5 July 1994 (1994-07-05) abstract ----- | 1 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT 99/23312

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---------------------|---|--|
| US 1396515 A | 08-11-1921 | NONE | |
| US 4015652 A | 05-04-1977 | NONE | |
| US 4561481 A | 31-12-1985 | JP 1044521 B JP 1575531 C JP 57205202 A DE 3208843 A | 28-09-1989 24-08-1990 16-12-1982 05-01-1983 |
| JP 05139106 A | 08-06-1993 | NONE | |
| BE 675106 A | 14-07-1966 | CH 433033 A FR 1434207 A LU 50260 A NL 6600375 A | 17-06-1966 14-07-1966 15-07-1966 |
| JP 06183223 A | 05-07-1994 | NONE | |